

DOCKET NO: 296946US0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :  
YOSHIHIRO NOMURA, ET AL. : EXAMINER: TSAY, MARSHA M.  
SERIAL NO: 10/594,758 :  
FILED: SEPTEMBER 29, 2006 : GROUP ART UNIT: 1656  
FOR: PROCESS FOR PRODUCING :  
SOLUBILIZED KERATIN :

DECLARATION UNDER 37 C.F.R. §1.132

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

Now comes Yuuiti Tsuda who deposes and states that:

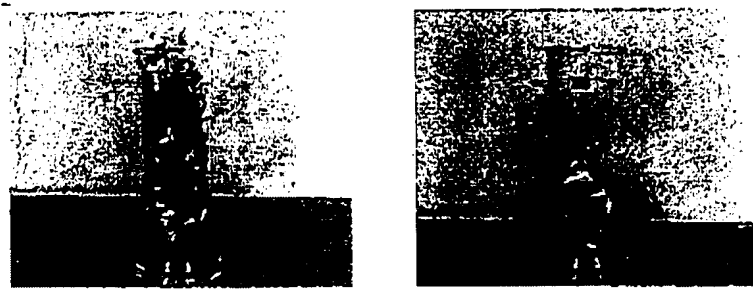
1. I am a graduate of Tokyo university of agriculture and technology and received my master degree in the year 2004 .
2. I have been employed by TOYO FEATHER INDUSTRY CO., LTD. for 4 years as a researcher in the field of biochemistry.
3. That I understand the English language or, at least, that the contents of the Declaration were made clear to me prior to executing the same.
4. The following experiments were carried out by me or under my direct supervision and control.
5. The effects of differences in water content of keratin raw material (feathers) on the rate of hydrolysis and keratin yield were determined.

6. Preparation of keratin raw material (feathers). Dry feathers were uniformly mixed with amounts of purified water sufficient to provide batches hydrated keratin raw material (wet feathers) whose water contents were 10% and 50%, respectively.

7. Hydrolysis of hydrated keratin raw material. In a beaker of inner volume of 500 mL, 150 mL of 0.3 N sodium hydroxide solution was added. 5.5g (of 10% of water content) and 10g (of 50% of water content) of wet feathers based on 5 g (in terms of the weight of dry feathers) of dry feathers were added gradually thereto not to fill the beaker, respectively, while stirring at a constant rate. After wet feathers were hydrolyzed for 6 hours and 18 hours at 60°C and were subjected to centrifugation for 30 minutes at 12,000 rpm, undecomposed residue was recovered. Decomposition rate of feathers was obtained from the weight of undecomposed residue dried for 18 hours at 80°C.

8. The volume of each hydrated raw keratin sample (wet feathers) was determined. Wet feathers having a water content of 10% and 50% based on 5 g (in terms of the weight of dry feathers) of dry feathers were added in a graduated cylinder of inner volume of 500 mL, respectively, and each volume of wet feathers was observed. Fig. 1 shows that the volume of the 10% hydrated sample exceeded 600mL in wet feather, and that the volume of the 50% hydrated sample was about 200mL. This shows that keratin raw material (wet feathers) having a water content within the range 20% to 80% have a lower volume than the corresponding sample having less water content (10% hydrated).

**Fig. 1**



Wet feather of 10% of water content

Wet feather of 50% of water content

9. The decomposition rate of keratin raw material samples having 10% or 50% hydration was determined. These samples were prepared and treated with 150ml of 0.3N sodium hydroxide solution for 6h or 18 hr at 60°C, as described in Sections 6 and 7. After hydrolysis the solutions were centrifuged and the sediment was dried as described in Section 7. The weight of the resulting dry matter was determined for each sample compared to the starting dry weight of the sample to calculate the decomposition rate.

10. As seen in Table 1, high decomposition rates were observed keratin raw material having a 50% degree of hydration (93.3% in 18 hour reaction, 79.8% in 6 hour reaction), while low decomposition rates were observed in samples having only 10% hydration (about 50% in both of 18 and 6 hour reactions).

Table I

Water content (%)	Reaction time (hours)	Decompositon rate (%)
10	6	50.7
10	18	50.3
50	6	79.8
50	18	93.3

11. As shown above, selection of a water content within the range 20%-80%

hydration provides a superior hydrolytic process, because the higher water content decreases the volume of the keratin raw material (feathers) permitting an increase in the amount of raw material in a reaction container, thus leading to superior and surprising increases in the efficiency of manufacturing solubilized keratin.

12. The undersigned petitioner declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

5. Further deponent saith not.

Customer Number

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Yumiti Tsuda  
Signature

December 9, 2008  
Date